tro-magnets led to the design of an improved electric generator described in his patents of 1863 and 1865. Wilde's "dynamo-electric machines"—as they were named by Charles Brooke, F.R.S.—quickly replaced batteries for electro-deposition and arc lighting, but in use they had the serious disadvantage of becoming very hot. In the endeavour to cure this fault Wilde designed a very different type of dynamo. This was a multipolar machine, with sixteen pairs of electro-magnets, which was made self-exciting by a "minor" current from four of the armature bobbins. Both this and the earlier machine were used by Elkington for the electrolytic refining of copper.

Wilde directed his attention to the use of his generators for other electro-chemical purposes. He obtained a patent in 1871 for protecting iron tubes from corrosion by coating them with copper, and four years later he introduced a valuable process for making by electro-deposition rollers of copper used in calico printing. With a revolving cathode he was enabled to employ relatively high current densities, and yet obtain a good quality of copper. This invention proved to be financially the most valuable of all his patents.

Experiments with two of the multipolar machines led to the discovery in 1868 that it was possible to run them, when in synchronism, as alternators in parallel. The importance of this was not realised until fifteen years later, when Dr. John Hopkinson, unaware of the work of Wilde, showed that this was theoretically possible, and now the parallel running of alternators is an everyday occurrence at supply stations.

Wilde designed direct- and alternating-current arc lamps suitable for search- and light-house purposes. Some large battleships were equipped with these under his direction, and after the *Titanic* disaster he strongly urged that mercantile vessels should be fitted with searchlights.

In 1884 Wilde retired from his business as an electrical engineer. During the remainder of his long life he chiefly devoted himself to special scientific subjects. He published a number of papers relating to atomic weights, and invented a magnetarium for reproducing the phenomena of terrestrial magnetism.

Wilde was a considerable benefactor to public institutions, amongst which must be especially mentioned the Literary and Philosophical Society of Manchester. Including the Wilde endowment, his contributions to the society exceeded 10,000*l*. He died at The Hurst, Alderley Edge, Cheshire, where his wife also died twenty-six years previously. He had no children. After some legacies, the residue of his estate has been bequeathed to the University of Oxford. W. W. H. G.

NOTES.

THE projected Atlantic flight is naturally exciting considerable interest at present, but it has recently been bad flying weather, and large storm systems have been sweeping eastwards across the ocean. For the flight to be safe and successful such disturbances must be avoided. In a statement issued on Monday by the Air Ministry relative to the weather factor of the flight, estimates were given of the time required for the flight eastwards and westwards between Newfoundland and Ireland under favourable and adverse conditions during the months of April, May, and June. The report states "that in every case weather conditions are more favourable for flying from Newfoundland to Ireland than from east to west, and that it would on certain occasions be impossible to accomplish the journey in the latter direction." It is not easy to see how the Air Minstry has used the available data, and there must necessarily be a great element of doubt meteorologically. The aeroplane flying eastwards will travel about four times as fast as the average easterly translation of an Atlantic storm, and may quite easily overtake at least one storm. A storm, on an average, takes four or five days in crossing the Atlantic from shore to shore; it may, however, be developed in mid-ocean and start its passage eastwards, and when nearing the European side the track of the storm may quite possibly be to the northward. The upper air generally has a quick movement to the eastward. So far as possible, for a successful air passage choice should be made of a period when the Atlantic is comparatively free from important storm areas; such periods exist, but under the present conditions indefinite waiting has its drawbacks. Meteorologists can scarcely favour an attempt to fly westwards until further experience is gained of the movements of the upper air.

WIRELESS telephony is being installed in the Folkestone-Cologne aerial mail service. Along this route a chain of call-stations is being erected, and the aeroplanes engaged in the service are being fitted with both sending and receiving sets. In practical tests it was found that clear voice signals were transmitted from 'plane to ground, and *vice versa*, at a distance of thirty miles. By operating a simple switch the connections are changed from "send" to "receive." A certain amount of voice-training is desirable, otherwise the voice may be drowned by the engine drone. The operator in the aeroplane wears a carefully fitted helmet with ear-receivers. It is necessary that complete freedom of movement should be ensured and all wind-noises eliminated. At present specially trained men are employed to fit on the helmets. Improvements are continually being effected in the methods and apparatus, so that the complete practical transmission of speech between aeroplanes and ground stations is assured.

No profession is free from its obscurantists, and the little band of half a dozen medical men who serve the anti-vivisectionist agitation have once again written to the *Times* to declare their conviction that experiments on dogs are unnecessary for the advance of medical science. Such a letter, devoid as it is of authority, serves a useful purpose in emphasising the weighty character of the resolution recently passed at the meeting of the British Medical Association, when the combined sections of medicine, pathology, and preventive medicine expressed their opinion, without a single dissentient, that the prohibition of experiments upon dogs would hamper the progress of medicine, and render Britain alone among civilised nations unable to contribute to progress in a department of medical research in which it has hitherto played a distinguished part. The Royal College of Physicians has also recorded its opinion "that the passing into law of the Dogs Protection Bill, now before the House of Commons, will greatly retard the progress of our knowledge with regard to the prevention and treatment of disease." The supporters of the Bill, to judge from their letters in the Press, are annoyed at the statement made by men who actually carry out experiments that, as the law is at present administered, it is impossible for dogs to suffer pain. They point to the power possessed by the Home Secretary of allowing painful experiments upon dogs, and see in this a proof that pain is inflicted. It is right and just that such powers should be possessed. Even though for the large majority of experiments infliction of pain is unnecessary, and, indeed, a disadvantage from every point of view, it is always possible that research into certain diseases might involve the necessity of inflicting pain; and in such cases the interests of a dog, as of any other animal, may reasonably be subordinated to those of man. It seems pitiful that there should be all this pother and expenditure of valuable energy just because the Government, which spends thousands annually on medical research, was lacking in the courage or the foresight to declare at the outset that in the interests of the community the Bill could not be allowed to become law. It is to be hoped that, even at this late hour, the Government will take a definite stand in the matter and relieve the investigators and the medical profession from the need of wasting their time in defending science and the welfare of the community against the attacks of misguided zealots.

The funeral of Sir William Crookes took place in Brompton Cemetery on Thursday, April 10, and was preceded by a service held at St. John's Church, Notting Hill. The three sons and one daughter, together with other members of the family, were present. Most of the learned societies in London were represented, among them being:—Royal Society, Sir J. J. Thomson, Prof. A. Schuster, and Prof. Emerson Reynolds; Royal Institution, the Hon. R. Clere Parsons; Chemical Society, Sir William Tilden and Dr. Alex. Scott; British Association, Prof. John Perry; Institution of Electrical Engineers, Mr. C. H. Wordingham, Col. R. E. Crompton, Mr. W. M. Mordey, and others; Society of Chemical Industry, Prof. Frank Clowes and Mr. J. P. Longstaff; British Science Guild, Sir Boverton Redwood and Lt.-Col. W. A. J. O'Meara; Institute of Chemistry, Sir Herbert Jackson and Mr. R. B. Pilcher; Faraday Society, Sir Robert Hadfield and Mr. F. S. Spiers; Institute of Inventors, Mr. W. F. Reid; Society of Psychical Research, Sir Lawrence Jones; Notting Hill Electric Light Co., of which Sir William Crookes was chairman for many years, the secretary, Mr. Rawkins. There were also present Sir William Davidson (Mayor of Kensington), Dr. Abraham Wallace, Prof. H. E. Armstrong, and many other distinguished men of science. A letter of condolence from his Majesty the King has been received by the family, and messages of sympathy have been sent by many prominent people in the world of science and literature who knew and valued the work of Sir William Crookes.

Prof. F. Morley has been elected president of the American Mathematical Society, and Prof. H. E. Slaught president of the Mathematical Association of America.

The sum of 100*l*. has been voted by the Rumford Committee of the American Academy of Arts and Sciences to Prof. A. G. Webster, of Clark University, in aid of his researches in pyrodynamics and practical interior ballistics.

Dr. J. W. Scott Macfie has been presented with the Mary Kingsley medal of the Liverpool School of Tropical Medicine in recognition of his distinguished services in research into tropical medicine and allied subjects.

Prof. J. H. Jeans will deliver a lecture entitled "The Quantum Theory and New Theories of Atomic Structure" at the ordinary scientific meeting of the Chemical Society to be held at Burlington House on Thursday, May 1.

The work on vulcanology at Kilauea has been placed under the U.S. Weather Bureau. We learn from *Science* that the transfer was made on February 15, and the appointment of the director, Prof. T. A. Jaggar, has been approved. A grant of 2000*l*. for the year is made by the U.S. Government for continuing the work heretofore maintained by the Volcano Research Association.

Mr. J. A. Cairns Forsyth has been awarded the Jacksonian prize for 1918 by the Royal College of Surgeons for his dissertation on "Injuries and Diseases of the Pancreas and their Surgical Treatment." The college has accepted an offer from the Barbers Company to endow for five years an historical lecture in anatomy or surgery, to be called the "Thomas Vicary Lecture," the appointment of the lecturer to be in the gift of the college.

On and after May 1 the library of the Chemical Society will be open daily from 10 a.m. until 9 p.m., with the exception of Saturdays, when it will be closed at 5 p.m. This further extension of the hours of opening has been made possible by the co-operation of the Society of Chemical Industry, the members of which are now able to use the library in common with the members of the societies mentioned in Nature of December 19 last (p. 310).

Mr. A. J. Walter, K.C., whose death occurred on April 9, was one of the best known members of the Bar in connection with patent actions. He was a man of science as well as an able advocate, and this rare combination secured for him a high reputation in patent trade-mark and technical litigation. He carried out many valuable experiments in chemistry and electricity in his private laboratory, and was thus often able to astonish expert witnesses with first-hand knowledge of importance relating to the points at issue. Mr. Walter had served on the council of the Institution of Electrical Engineers, and his death deprives, not only the Bar of a distinguished leader, but also science of a keen student.

The Faraday Society and the Röntgen Society are holding a joint general discussion on the examination of materials by X-rays on Tuesday, April 29, at 5 p.m. in the rooms of the Royal Society. Sir Robert Hadfield, president of the Faraday Society, will introduce the discussion, and also contribute some papers, and an address on radio-metallography will be delivered by Prof. W. H. Bragg. Other contributors include Major G. W. C. Kaye, Capt. R. Knox, and M. E. Schneider (Le Creusot). The discussion will include contributions on the examination of timber as well as of metals by X-rays, and there will be exhibits of apparatus and demonstrations by M. Pilon, Major C. E. S. Phillips, Mr. Geoffrey Pearce, and others.

Dr. Louis A. Bauer has finally selected Cape Palmas, Liberia, as his observing station for magnetic and electric observations in connection with the solar eclipse of May 29. He will be assisted by Lieut. H. F. Johnston, who has rejoined the staff of the Department of Terrestrial Magnetism, having been on duty during the war at the Admiralty Compass Observatory at Slough. The party sailed on the steamer *Benue* from Liverpool on April 12. Mr. Frederick Brown, at one time assistant at the Royal Observatory, Greenwich, has been sent by Dr. Bauer to Duala, Cameroons; he sailed from Liverpool on April 9. Mr. Brown, in addition to magnetic survey work in West Africa, will make special magnetic observations during the eclipse at a station as near as possible to Ile Principe or Libreville.

The death of Dr. Bruno Hofer on July 7, 1916, at the age of fifty-four years, is announced in German fisheries papers that have just been received in this country. Dr. Hofer had attained a great reputation as a fisheries biologist; he was director of the Royal Bavarian Biological Experimental Station for fresh-water fisheries at Munich, and was for many years editor of the *Allgemeine Fischerei-Zeitung*. The exploitation of carp and other lake and river edible fishes was of great value to Germany, and was the subject of much sound economic and scientific research. Dr. Hofer's book, "Handbuch der Fischkrankheiten," was well known here; it broke entirely new ground in its treatment of the pathology of fresh-water fishes, and in spite of its rather limited scope, still remains the only compendium on the subject.

The following are among the subjects of lecture arrangements at the Royal Institution after Easter:—Prof. Arthur Keith, British Ethnology: The People of Wales and Ireland; Prof. W. H. Bragg, Listening under Water; Dr. H. S. Hele-Shaw on clutches; Prof. F. Keeble on intensive cultivation; Sir Valentine Chirol, The Balkans; Prof. H. S. Foxwell, Chapters in the Psychology of Industry: (1) Fourier and other Pioneers in the Movement for the Humanising of Industry; (2) Modern Industrial Organisation: Where it Fails to Observe the Humanities of Industry, and the Results. The Friday evening meetings, at 5.30 o'clock, will recommence on May 2, when Prof. J. W. Nicholson will deliver a discourse on energy distribution in spectra. Succeeding discourses will be given by Sir George Macartney, Dr. S. F. Harmer, Sir Alexander C. Mackenzie, Sir John Rose Bradford, and Sir Ernest Rutherford.

A note on German and English war-time diets is contributed to the Journal of the Royal Statistical Society (vol. lxxxii., part 1, January) by Dr. Major Greenwood and Cicely M. Thompson. From the records of German towns, according to Government statistics, the average food-value in that country was 2352 Calories per head per day in April, 1916, and 2007 in April, 1917. In June, 1917, the corresponding averages of six canteens and hostels in Great Britain were 3168 and 3073 Calories, while in April, 1918, the averages for three women's munition hostels were 2782 and 2699 Calories per head per day. It should, however, be noted that the German statistics referred to the consumption of food in ordinary families, and this and other circumstances preclude any attempt at a very exact comparison of the conditions of living.

The Italian Society for the Progress of the Sciences is holding its tenth meeting at Pisa on April 14–19 under the presidency of Prof. Fernando Lori. Unlike our British Association, the proceedings very largely centre round developments of economic importance, and the majority of the papers are divided into three classes: Class A, dealing with mining, mineralogy, and geology; Class B, with agriculture, medicine, fisheries, and biology; and Class C, with economics and political science. A few sectional papers on other branches of science are included in the programme, which opened on Monday, April 14, in the *aula magna* of the University of Pisa with a discourse by Prof. Raffaello Nasini on Italy's mineral wealth. Friday and Saturday, April 18 and 19, are to be devoted to excursions. The ordinary subscription is ten francs, and the offices of the society are at 26 Via del Collegio romano, in Rome.

The conference representing Allied Red Cross Societies now meeting at Cannes has held important meetings on venereal disease, on tuberculosis, and on malaria. As regards venereal disease, there was a general agreement that some uniform action is needed—as, for example, on such subjects as the control of prostitution and on notification of the disease. Similarly with tuberculosis, there was unanimity of opinion that a common scheme of action is necessary throughout the world on the lines which have been adopted in this country, and also to a large extent in the United States. As regards malaria, Prof. Castellani gave some interesting figures on the control of malaria in four camps in the Adriatic zone. In one camp no anti-malarial measures were taken; in the second, preventive doses of quinine were given; in the third, anti-mosquito measures were employed; and in the fourth both quinine and anti-mosquito measures were used. The results were that the following percentages of the occupants were affected with malaria:—In the first camp, 100 per cent.; in the second, 45 per cent.; in the third, 25 per cent.; and in the fourth, only 6 per cent.

The British Photographic Research Association, which was incorporated nearly a year ago under the presidency of Sir J. J. Thomson, has just issued a "Programme of Research," in which it is announced that Dr. R. E. Slade has been appointed the director of research, and that he and his staff will work for the time being in laboratories at University College, London. The laboratories assigned to them are distinct from the teaching laboratories. The fundamental subjects that it is intended to investigate include the properties of silver haloids, the properties of gelatin and similar colloids, colloidal chemistry in general, photo-chemical reactions, and the theory of colour-photography processes. Among the subjects of applied research will be desensitising and reducing agents, gelatin (seeking for the causes of the effects of various samples and to obtain standardisation and improvement of the material), photographic apparatus (the treating of wood, canvas, and leather, and the production of special alloys), enamels, paper, cardboard, and colour photography. The association welcomes inquiries from its members on technical points, and will endeavour to reply helpfully. But it is not the intention of the association to attempt to standardise throughout the manufacturing methods of the photographic industry, as manufacturers will continue to determine for themselves the lines on which their businesses shall be developed. It is very truly added that the programme covers a vast field for research, but it is hoped to explore first the most productive portions of this field. It is encouraging to everyone concerned to be assured that results have already been obtained which it is expected will have a wide application in the industry.

The bark of the locust tree (*Robinia pseudacacia*) is poisonous when eaten by horses and cattle. A toxic albumose is present in it, and a toxic glucoside, named "robitin," has now been isolated by B. Tasaki and U. Tanaka (Journal of the College of Agriculture, University of Tokyo, vol. iii., No. 5, p. 337). In the fresh bark 1 per cent. of the glucoside is present, and toxic reaction is caused by a dose of 0·0015 grm. in the horse and 0·02 grm. in cattle. The reaction caused by the injection of "robitin" into the horse is exactly that produced by the fresh bark, and consists in dyspnœa, increase of secretions and excretions, and paralysis of the hindquarters.

The Board of Agriculture and Fisheries has issued as a Supplement (No. 18) to the *Journal of the Board of Agriculture* a series of articles dealing with the cultivation, composition, and diseases of the potato. The various sections of the Supplement deal with potato-growing, the food value of the crop, potato diseases, the causes of decay in potato clamps, potato-spraying, variety tests, and the Wart Disease Order. As a compendium of information on these various phases of the subject the Supplement should prove of great interest and value to growers of potatoes, whether on a large or a small scale. The sections dealing with diseases and disease-resisting varieties form the main features, and are well illustrated by coloured plates and photographs.

IN the March issue of the *Journal of the Board of Agriculture* Dr. W. E. Collinge reports the results of further investigations on the food of wild birds. The observations, together with those previously reported, are based upon the examination of the stomach and crop contents of 4468 adult birds and 761 nestlings, embracing seventeen species of wild birds. On the basis of these observations two species appear to be distinctly injurious, viz. the house-sparrow and the woodpigeon. Three species are too numerous, and consequently injurious, viz. the rook, sparrowhawk, and starling. One is locally too numerous, viz. the missel-thrush. Three species are distinctly beneficial, but do not warrant special protection, viz. the jackdaw, yellow bunting, and song-thrush. Seven species are so highly beneficial that their protection is advisable, viz. the skylark, green woodpecker, kestrel, lapwing, great tit, blue tit, and fieldfare. With regard to the chaffinch the opinion is expressed that, in spite of the injuries it commits, it would be unwise to adopt repressive measures.

IN relation to an inspection of the Sheffield City Museums which he made in 1915, Dr. F. Grant Ogilvie has now issued a report on the subject. While the report deals with Sheffield museums in particular, it will be of value to all local authorities in indicating the lines on which they should develop local museums, especially in industrial centres. The recommendations regarding municipal interests and science and industry are particularly worthy of attention. Among municipal interests should be maps, plans, and models illustrating the local topography, resources, occupations, public works and services, both in the present and past. In fact, this section should comprise a complete survey of the town and neighbourhood. The value of such collections to the architect and town-planner is obvious. They would also serve to give residents a better understanding of their own town, and so might promote the growth of civic consciousness. Dr. Ogilvie's report, however, is severely practical, and, besides discussing the value of the collections he proposes, he indicates what objects should be included and how they can be best displayed. The advice given to details of space and housing is very valuable. The report is issued by the Board of Education as No. 34 of its series of educational pamphlets.

WE have received a copy of the convention between the United States and Canada for the protection of migratory birds. The convention, with an introduction and explanatory notes, is published by the Department of Agriculture, Ottawa. The provisions and regulations of the convention show that it is probably the most important and far-reaching measure ever taken in the history of bird protection. It affects more than a thousand species and subspecies of birds from the Gulf of Mexico to the North Pole, and should lead in a few years to a great increase in the numbers of several species of considerable economic importance. All migratory insectivorous and migratory non-game birds and their eggs are permanently protected, with the exception of certain species which Indians and Eskimo are allowed to take for food, but not for sale. Shore-birds and waders, with a few exceptions, are protected for ten years, and the same protection is given to cranes, swans, and curlew. Wood-duck and eider-duck are protected for five years. Close seasons, varying in different parts, are instituted for wildfowl and other migratory game birds. The convention contains provisions by which specimens of birds and eggs may be secured for scientific purposes, but it is clear that permission will be granted only after careful investigation. Local modifications in the convention may be made in the case of birds which prove injurious to agricultural interests.

AN account of a five months' journey in Colombia, down the Magdalena River, and through the north-east of the Republic, is described in a pamphlet by Mr. M. T. Dawe, agricultural adviser to the Colombian Government. The pamphlet is published in English by the Ministry of Agriculture, Bogota. Mr. Dawe's object was to report on the agricultural possibilities of the region and the occurrence of coal. The article, besides discussing very fully the suitable crops, labour conditions, and transport requirements, contains a great deal of useful geographical information about a little-known region. Mr. Dawe was particularly struck with the stock-raising possibilities of the Goajira peninsula, which has an area of about 4000 sq. miles. Being fairly high and almost surrounded by the sea, the peninsula has a healthy, if rather dry, climate. There are large regions of good pasture-land, of which 90 per cent. is still unoccupied. Artesian wells would have to be sunk to supplement the water supply. Cotton and ground-nuts could also be cultivated in the peninsula. The present inhabitants are some 40,000 Indians, who are steadily emigrating to Venezuela for lack of industries to keep them at home. The Sierra Nevada is another region well suited for colonisation; fruit-growing offers good prospects of success. Speaking generally of these districts and the whole of the Magdalena province of Colombia, Mr. Dawe advocates the encouragement of Japanese colonisation, which he holds has been successful under comparable conditions in Brazil. He does not explain why emigrants from Mediterranean Europe would not be suitable.

MR. R. S. WHIPPLE read two interesting papers on "Electrical Methods of Measuring Body Temperatures" and "The Electro-Cardiograph" before a joint meeting of the Institution of Electrical Engineers and the Royal Society of Medicine on March 21. In the former paper Mr. Whipple arrives at the conclusion that a continuous record of the temperature of the human body can be best obtained by an electric thermometer placed in the rectum. For very accurate research work a thermo-electric couple can be used in conjunction with a photographic recorder. The electro-cardiograph utilises the discovery first made by Prof. Waller that the electric potentials developed in the heart at each contraction of the organ were sufficiently large to deflect a sensitive galvanometer. The cardiograms shown by the lecturer were exceedingly instructive, and it was easy to believe that they have a great and growing value in medical practice.

AT the meeting of the Royal Photographic Society held on February 18, Mr. S. H. Williams described his new process of printing on paper in natural colours, and showed several examples. Mr. Williams makes one plate and one exposure serve for the three colour records by exposing it behind a screen that has 540 lines to the inch, the lines being alternately red, green, and blue, and of equal widths. By placing over this negative a key-plate that is ruled with black lines of double width and with single-width spaces, that portion exposed behind each colour may be alternately isolated as the key-plate is shifted. This adjustment is done mechanically, identification marks indicating which colour record is exposed, and as contact prints cannot be obtained, an enlarging lantern is used. The prints may be obtained "in any one of a dozen different ways," but Mr. Williams prefers the bromoil process, inking up with the three necessary colours and superposing the prints by transferring the ink images to drawing-paper. The lines are not obtrusive in the resulting pictures, and, if desired, they can be obliterated by putting the image slightly out of focus when making the exposures for the prints. The method of making the screens is also described in the *Photographic Journal* for March.

In an address to the Franklin Institute, Philadelphia, which is reproduced in the Journal of the institute for January, Mr. H. Leffmann shows that the pioneer experiments in aviation carried out by the late Prof. S. P. Langley were complete enough to form the basis for modern practice. In May, 1896, Prof. Langley launched from a small island in the Potomac an unmanned aeroplane driven by a steam-engine which ascended to an altitude of 60 ft. or 70 ft., and travelled at about twenty miles per hour for eighty or ninety seconds before descending. With the help of a grant from the Government and the mechanical assistance of Mr. C. M. Manly, he constructed an internal-combustion engine of 18 b.h.p. weighing only 108 lb., and in 1903 Mr. Manly made an experimental flight on a machine driven by this engine. Through some accident not clearly understood, the flight came to a premature conclusion, and the pilot narrowly escaped drowning. Prof. Langley died in 1907 without making any further experiments, but in 1914 the machine of 1903 was flown successfully by Mr. G. H. Curtiss. When the engine was replaced by one of 80 h.p. a number of flights were made which demonstrated that the principles of the Langley machine were sound and practical.

The *Cambridge University Press* is publishing for Dr. A. E. Shipley, Master of Christ's College, and Vice-Chancellor of the University of Cambridge, an account of the author's experiences during his recent visit to the United States of America. It will be entitled "The Voyage of a Vice-Chancellor." "The Furniture Beetle" is in preparation for appearance in the series of Economic Pamphlets of the British Museum (Natural History), and "The Danger of Disease from Fleas and Bugs" for appearance in the Museum's series of Economic Leaflets. *Mr. W. Heinemann* is about to publish "Psychology and Parenthood," by H. A. Bruce, who aims at presenting to parents particulars of the discoveries in child-nature obtained by psychologists and others. *Messrs. Longmans and Co.* announce a book which should be of interest to educationists, viz. "The Manchester Grammar School, 1515–1915: A Regional Survey of the Advancement of Learning since the Reformation." The author is Dr. A. A. Mumford.

OUR ASTRONOMICAL COLUMN.

Observed Changes on Jupiter.—Some remarkable alterations in the surface-markings of this planet have been observed recently. The bay or hollow in the south equatorial belt, which has been almost uninterruptedly visible since Schwabe figured it in September, 1831, appears to have disappeared. Mr. F. Sargent, of Bristol, using telescopes of 10½ in. aperture (reflector) and 5 in. (Cook refractor), has been unable to see any distinct traces of the feature named during his very recent observations. It was an important marking as serving to show the position of the great red spot, which has been very faint during a long series of years. In 1901 a large dark mass made its appearance in the south tropical zone of Jupiter, and in about the same latitude as the red spot. This moved with greater speed than the latter, its rate of rotation being about 12 seconds less, and the marking had so greatly extended in longitude that in January and February of the present year it ranged over about 180°, or half the planet's circumference. This object seems also practically to have disappeared. Mr. Sargent saw the following end of it central on March 7 at 10h. 13m. in longitude 60·3°, but it was extremely faint, and regarded as near the vanishing point. Since that date observations have failed to reveal the object, though the disc has been carefully scanned at those times when it must have been presented to view had it continued visible.

Drawings of Mars.—*Popular Astronomy* for February contains an interesting series of comparative drawings made by five observers at the last opposition, according to a prearranged scheme organised by Prof. W. H. Pickering. On the whole, the accord of the different draughtsmen is satisfactory; thus of 131 canals appearing on the sketches, eighty-three are confirmed by at least one other observer. The Rev. T. E. R. Phillips noted that he could see nothing with the Greenwich 28-in. that was not visible in his own 8-in. Several observers mention the beautiful blue tint of Syrtis Major; the other maria tended to grey or brown.

The Gegenschein or Counterglow.—This phenomenon has a great fascination for Prof. Barnard, who in 1899 published his observations extending over sixteen years. Prof. Barnard made another series last autumn (which he states to be the best season to observe it), and gives the results in *Popular Astronomy* for February. As in the previous set, the longitude comes out exactly 180° from the sun, the latitude 0·3° N. The diurnal parallax appeared to be insensible. He favours the explanation that it is an atmospheric phenomenon, the earth's atmosphere acting as a spherical lens and concentrating the sun's light. He mentions two other explanations as possible: that of Evershed, that the earth has a tail like a comet; and that of Moulton, that there is an aggregation of meteoric bodies at the point opposite the sun describing periodic orbits under the combined action of sun and earth.

Tycho Brahe's Original Observations.—An article by Dr. J. L. E. Dreyer in *Scientia* for March states that the manuscript books in which Tycho's observations were entered night by night were sold to the King of Denmark, and are now in the Royal Library at Copenhagen. A contemporary fair copy of most of them is now in the Imperial Library at Vienna, and from this copy an edition was prepared by a Jesuit named Curtius in 1666. This is known to be very incomplete and incorrect, and a new edition is being prepared by Dr. Dreyer from the original observing books and from the copy at Vienna, which will form vols. x.–xiii. of the collected works of Tycho Brahe, now being printed at Copenhagen.

THE DEVELOPMENT OF AIRSHIP CONSTRUCTION.

Among the important papers read last week at the Institution of Naval Architects was one on airship construction by Mr. C. I. R. Campbell, who has been responsible at the Admiralty for the design of our airships. In British practice it is assumed for design purposes that the gas has a lift of 68 lb. per 1000